

2 Description of Alternatives

There are two alternatives considered in this final environmental assessment, the No Action Alternative and the Proposed Action Alternative. These two alternatives differ by the method in which the 602(a) storage requirement is calculated. As discussed in the Introduction, storage equalization releases from Lake Powell are linked to 602(a) storage requirements. Storage equalization releases are not scheduled in years when Upper Basin mainstem storage falls below the 602(a) storage requirement.

NO ACTION ALTERNATIVE

The Bureau of Reclamation has historically utilized a modeling algorithm for calculating 602(a) storage volumes in the Colorado River Simulation System (CRSS) to determine when storage equalization releases from Lake Powell should be made.⁷ This algorithm incorporates the relevant factors listed in Article II (1) of the Long-Range Operating Criteria. This algorithm will be referred to in this final environmental assessment as the “602(a) storage algorithm.” The 602(a) storage algorithm has been utilized for over 20 years in modeling studies that involve simulation of the Colorado River. The 602(a) storage algorithm is considered in the preparation of each year’s Annual Operating Plan.

The 602(a) storage algorithm uses the driest 12-year historic critical period of inflows into Lake Powell (1953-1964) to represent a period of extremely dry future hydrology.⁸ Releases from Glen Canyon Dam during this modeled future period are assumed to be 8.23 million acre-feet annually. Evaporation from Upper Basin mainstem storage reservoirs is included in the calculation. Upper Basin uses (depletions) are assumed to increase from current levels according to projections provided by each of the Upper Basin States. Each of the above is a component in an equation that produces the 602(a) storage volume. On a 12-year cumulative basis, the equation adds inflow and subtracts depletions, evaporation, and releases to obtain a 602(a) storage volume. The exact mathematical expression for the 602(a) storage algorithm is included as Attachment B.

Each year the model performs this 12-year mass balance in the Upper Basin to determine the storage volume necessary in the Upper Basin to assure deliveries from Lake Powell to the Lower Basin under the Compact without impairing Upper Basin uses. This approach assumes that the next 12 years have the inflow hydrology of the critical period. Since Upper Basin uses (depletions) have generally increased with time, the storage required under 602(a) in the Upper Basin has also increased with time. With increased uses, more water is needed in storage to assure required deliveries to the Lower Basin without the impairment of Upper Basin uses. Eventually it is expected that later in this century, when the Upper Basin has developed its full

⁷ CRSS is a modeling system that simulates operation of the Colorado River reservoir system. Additional information on the CRSS is found in Chapter 3.

⁸ Use of a “critical period of record” in determining 602(a) storage requirements is one of the relevant factors described in Section 602(a) of the Colorado River Basin Project Act and Article II (1) of the Long-Range Operating Criteria.

allocation from the Colorado River, the computed 602(a) storage level will approach the entire reservoir capacity of the Upper Basin mainstem storage reservoirs.

Figure 2.1 depicts prospective 602(a) storage as calculated using the 602(a) storage algorithm. The 602(a) storage algorithm represents the baseline condition in this final environmental assessment and is the best representation of the No Action Alternative.

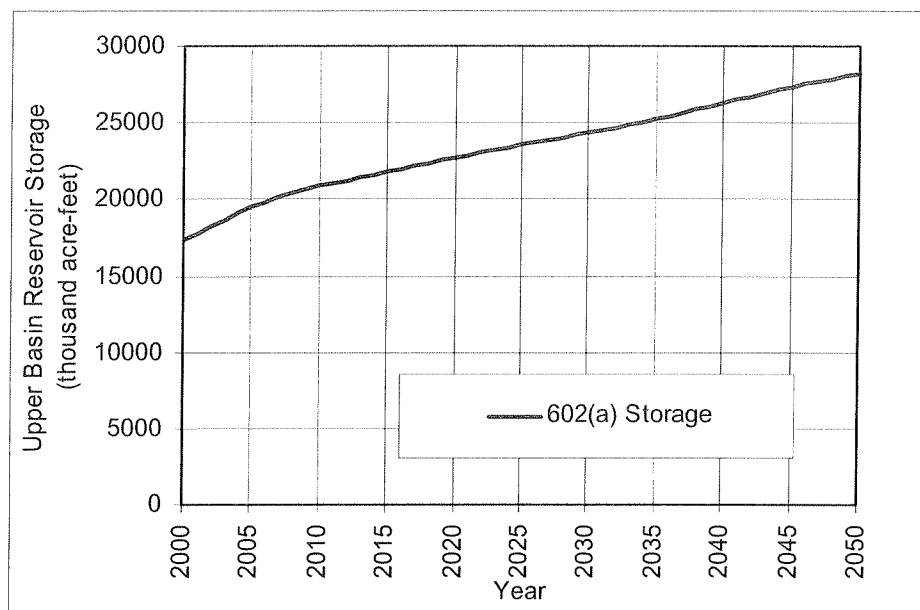


Figure 2.1.—Baseline condition – No Action Alternative.

The 602(a) storage algorithm compares computed 602(a) storage with the sum of the active storage of the four Upper Basin mainstem reservoirs: Flaming Gorge Reservoir, Blue Mesa Reservoir, Navajo Reservoir, and Lake Powell. In years when actual combined storage in these Upper Basin Reservoirs on September 30 is projected to be below the computed 602(a) storage level (the line in Figure 2.1), the objective is to maintain a release of a minimum of 8.23 million acre-feet. Conversely, when actual combined storage exceeds the 602(a) storage level computed by the algorithm, and when storage in Lake Powell is greater than Lake Mead, storage equalization releases are made from Lake Powell to equalize, as nearly as practicable, the storage in Lake Powell with that of Lake Mead. Under the No Action Alternative, storage equalization releases are never made when the combined projected storage of Flaming Gorge Reservoir, Blue Mesa Reservoir, Navajo Reservoir, and Lake Powell is below the 602(a) storage calculation shown in Figure 2.1 on September 30 of any given year.

PROPOSED ACTION ALTERNATIVE

The Proposed Action Alternative would adopt the Basin States' recommendation to limit 602(a) storage equalization releases when the storage level in Lake Powell is projected to be below 14.85 million acre-feet (elevation 3,630 feet) on September 30 as an added consideration in the 602(a) determination through the year 2016. Under the Proposed Action Alternative, water year releases from Lake Powell would be made with the objective to release a minimum of 8.23 million acre-feet when Lake Powell is projected to be below 14.85 million acre-feet (elevation 3,630 feet) on September 30.

The Proposed Action Alternative analyzed in this final environmental assessment also uses the 602(a) storage algorithm utilized in the No Action Alternative (as depicted in Figure 2.1). The only difference between the Proposed Action Alternative and the No Action Alternative is that the 14.85 million acre-feet (elevation 3,630) requirement is superimposed.

Because the 602(a) storage algorithm is still active in modeling the Proposed Action Alternative, there is not an "on" or "off" switch for limiting storage equalization releases that is dependant solely upon whether Lake Powell is above or below 14.85 million acre-feet (elevation 3,630 feet). Sometimes, the 14.85 million acre-feet (elevation 3,630 feet) requirement controls whether storage equalization releases are restricted and annual releases are limited to 8.23 million acre-feet, and at other times the 602(a) storage algorithm controls this determination.

In the Proposed Action Alternative, in the years 2004 through 2008, the Lake Powell 14.85 million acre-feet (elevation 3,630 feet) requirement tends to be the controlling component in limiting storage equalization releases. Beyond the year 2008, as Upper Basin depletions increase, the 602(a) storage algorithm tends to control when storage equalization releases are limited. Since the 602(a) algorithm considers storage in not only Lake Powell, but upstream reservoirs as well, and because the degree of future increases in Upper Basin depletions is not exactly known, there is no precise year in the future that can be identified when the 602(a) storage algorithm would become the controlling factor.

In modeling the Proposed Action Alternative, this concept is important because there could be times when Lake Powell would have more than 14.85 million acre-feet in storage, but the combined storage in Lake Powell, Flaming Gorge, Blue Mesa, and Navajo Reservoirs is still less than 602(a) storage as computed by the algorithm.⁹ Conversely, there could be times in which Lake Powell would have less than 14.85 million acre-feet in storage, but the combined storage of Upper Basin mainstem reservoirs is more than the calculated 602(a) storage as computed by the algorithm.¹⁰

⁹ In this case, storage equalization releases would not be made under either the No Action or Proposed Action Alternatives.

¹⁰ In this case, storage equalization releases would be made under the No Action Alternative, but not under the Proposed Action Alternative.